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FIFTEENTH ANNUAL REPORT OF THE DIRECTOR.

SUBMITTED TO THE TRUSTEES JAN. 13, 1904.

To the Board of Trustees of the Missouri Botanical Garden:

The following report on the Missouri Botanical Garden and the School of Botany therewith connected is respectfully submitted in compliance with the rules of the Board. As was done with my tenth report,* this, which marks the passage of another convenient period of time, is made to present a resumé of progress.

Briefly stated, the broad purposes of the founder of the Garden, as indicated in his will,† were to maintain an attractive and instructive garden easily accessible to the public; to secure its utilization for research in botany, horticulture, vegetable pathology and allied sciences by equipping it with herbarium, library and laboratory conveniences; to educate capable gardeners; and to promote a general knowledge of botany, both pure and applied.

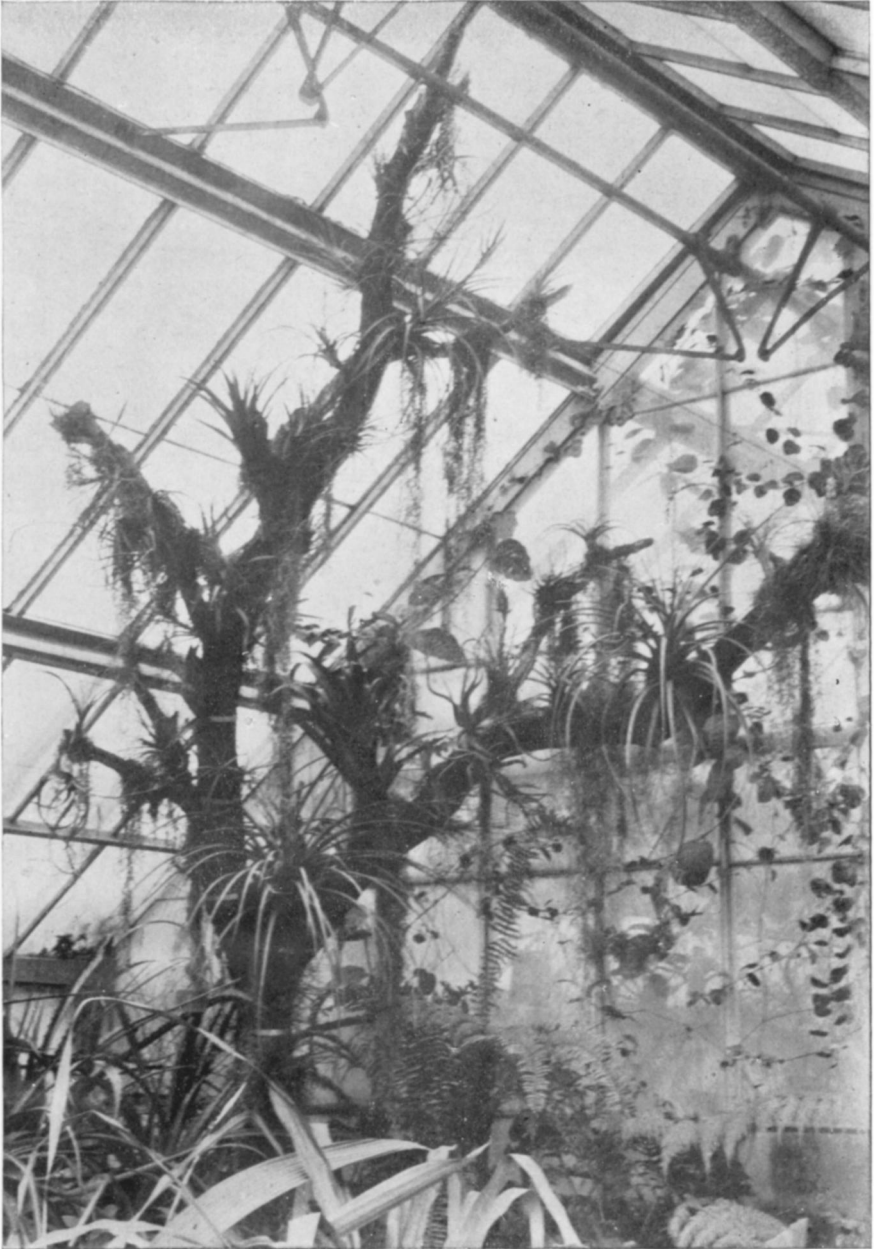
For the furtherance of these purposes, the Board of Trustees, on its organization, adopted the following general rules‡ for the guidance of the Director in planning and carrying out the work intrusted to him: —

1. To continue or even augment the present ornamental features of the garden.
2. To add to its botanical usefulness and interest by the introduction as opportunity offers of plants representative of the American flora, so that, other things being equal, these shall be largely represented and may even preponderate outside of the greenhouses, giving, then, in the garden, an epitome of the leading characteristics of our native flora.
3. To carry into execution, as rapidly as possible, a system of correctly naming and labeling all plants in the garden with the exception of such

* Rept. Mo. Bot. Gard. **10**: 12.

† Rept. Mo. Bot. Gard. **1**: 29. — See also Popular Science Monthly. **62**: 193.

‡ Rept. Mo. Bot. Gard. **1**: 93.



BROMELIAD HOUSE—AIR PLANTS.

as may be used in ribbon-gardening or for other exclusively ornamental purposes.

4. To provide fire-proof quarters for the invaluable herbarium of the late Dr. George Engelmann, and to immediately mount it in the proper manner so as to insure its preservation and availability for scientific use. Also, to provide for and add to the general herbarium (based on that of Bernhardt) now at the garden with the special object of ultimately making it complete in good representatives of American plants.

5. To arrange, bind, and index the books and pamphlets at the garden. Also, to provide more ample but equally safe accommodations for the library, to bring it up to date as rapidly as possible, to enter subscriptions for periodical publications, and to keep it abreast of the times, and in the most useful form, by the purchase of important publications, as they shall appear, and by the proper indexing of periodicals and pamphlets.

6. To secure a botanical museum, containing material needed for study or calculated to advance general or special knowledge of botany.

7. To direct the main energy of research for the present toward assisting in the completion of a systematic account of the flowering plants of North America, by the publication of monographs of different Orders and Genera, illustrated when this may seem desirable; and to specially cultivate representatives of such groups for purposes of study.

8. To gradually acquire and utilize facilities for research in vegetable histology and physiology, the diseases and injuries of plants, and other branches of botany and horticulture, as special reason for developing one or the other may appear.

9. To make the facilities of the garden useful in botanical and horticultural instruction, as they increase and opportunity for such work appears: meantime, in all feasible ways, to attract to the School of Botany students of promise, and to provide for their instruction and the best use of their time as investigators.

10. To take steps looking to the appointment of six "garden pupils," — youths with at least an elementary English education, who shall be regarded as apprentices in the garden, working under the direction of the head gardener and foreman, and shall hold scholarships yielding \$300.00 per year each, together with free lodging near or in the garden, and free tuition in the School of Botany; and who, after having worked for six or more years (as shall ultimately prove best*) in the different departments of the garden, and proved proficient in its practical work, may be admitted to examination for a certificate of proficiency in the theory and practice of gardening.

11. To have in mind, in appointing associates for the Director, their special aptitude in some one of the branches indicated above, so that

* This time was subsequently reduced to four years. — Rept. Mo. Bot. Gard. 4:17.

with each appointment the efficiency of the institution for instruction and original work may be broadened and increased.

I am pleased to have been able to show each year, and to emphasize in the contrast afforded by this quinquennial summary, individual progress in nearly all of these specifically named directions, and gratifying collective advance in achieving the broad purpose of the founder of the Garden.

ORNAMENTAL FEATURES.

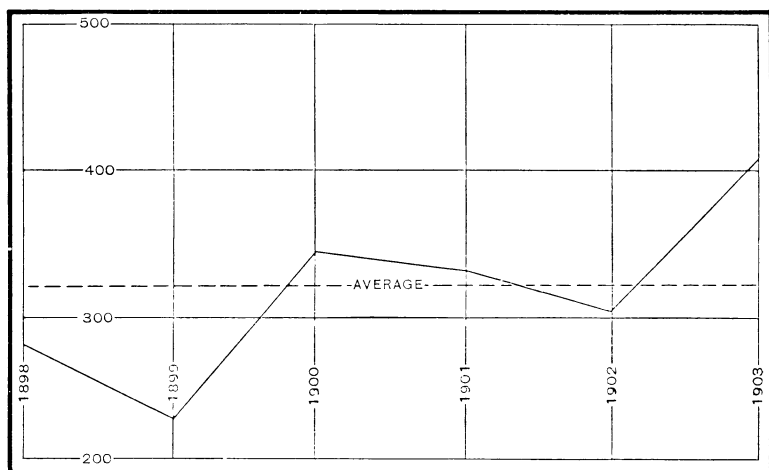
The testimony of visitors shows that there is popular appreciation of the growing beauty of the Garden in which, though the area under cultivation for floricultural purposes has not been enlarged, varied planting alone makes a new impression of beauty each year, which is justified in fact by the yearly selection of more decorative species for planting. A large and continuing increase in the collections of certain kinds of tender plants, especially orchids and bromeliads, makes this even truer of the plant houses than of the open-air plantations, while the provision of more and better growing-houses enables the gardeners to keep up a more uninterrupted succession of winter blooming plants in the main houses with the passage of each year. In one detail only, is the Garden less beautiful than when it came under the care of the Board, — for the ravages of the tornado of 1896 among the trees are repaired but slowly, although each year sees a betterment in this respect.

During the year just closed, 405 consignments, comprising 66,790 plants or packets of seeds, were received for growth at the Garden. Of these, 4,221, valued at \$369.85, were collected, and 24,310, valued at \$1,701.70 were propagated by employees, the two comprising 58 of the 405 entries; 6,103, representing 208 consignments and valued at \$707.35, were presented or received in exchange for

material or publications from the Garden; and 32,156, representing 139 entries, for which \$3,032.18 was expended, were purchased. Of this expenditure, \$1,300.18 was for plants for the North American tract.

Among the notable gifts of the year should be mentioned four magnificent Hawaiian tree-ferns, presented by Mr. James Gibb, whose interest was secured through Mr. Jared G. Smith, a former Assistant at the Garden; two tree-ferns, presented by Dr. J. C. Willis, Director of the botanical garden at Peradeniya, Ceylon; a mature staminate

DIAGRAM A.



CONSIGNMENTS OF PLANTS.

plant of *Cycas revoluta*, presented by Mr. W. T. James of Bermuda; and 78 orchids, presented by the New York Botanical Garden.

The number of consignments of plants since 1898, with the average for the last five years, is presented on the accompanying diagram, which shows two periods of unusual activity, the first, in 1900, due to the energy of Mr. P. T. Barnes, then Plant Recorder at the Garden, and the second, in 1903, largely a result of the energy of the Superintendent, Mr. H. C. Irish.

In 1898 the number of distinct species and varieties cultivated was found by inventory to be 8,009.* At the end of each subsequent year those reported as dropped from cultivation and those known to have been added have been footed up, and the net gain for the year noted.† For 1903, the records show a loss of 521 and an addition of 1,573, or a net increase for the year of 1,052.

It is difficult, however, to keep close track of the annuals dropped from cultivation, or to get gardeners always to report the loss of what are intended to be permanent plants, so that a quinquennial or other inventory is essential for the periodical correction of the records. Such an inventory, taken at the end of 1903, shows that 11,357 species and varieties are now actually in cultivation at the Garden. This number is 1,246 less than that given by the records (12,603) and even 184 less than the summary of records gave at the end of 1902,‡ — the difference between the recorded and inventoried totals representing the accumulated errors of the records for five years. The verified increase of 3,348 shown by comparing the inventory summary of 1898 with that of 1903 is 41.8 per cent of the total at the end of 1898, or an average of about 8 per cent for each of the last five years. The average number for the past five years is 9,683, or almost double the number estimated to be in cultivation in 1895.§ The diagram on the following page shows the yearly growth in species and varieties cultivated.

As in previous years, plants and seeds which could be spared have been sent to exchanging institutions and to investigators who have needed them for purposes of study, this distribution for 1903 reaching 506 plants and 95 packets of seeds, collectively valued at \$92.65. Surplus

* Rept. Mo. Bot. Gard. **10**: 15.

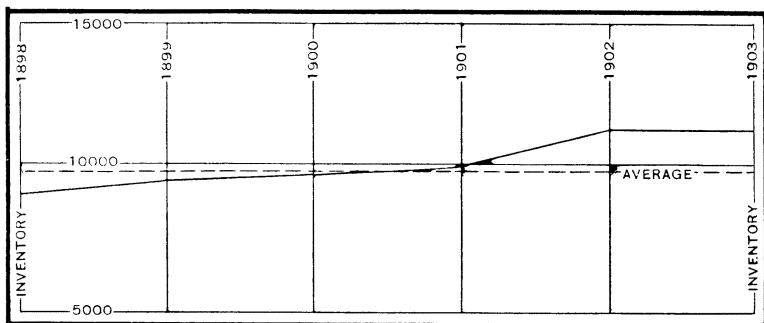
† Rept. Mo. Bot. Gard. **11**: 13. **12**: 13. **13**: 18. **14**: 15.

‡ Rept. Mo. Bot. Gard. **14**: 15.

§ Rept. Mo. Bot. Gard. **7**: 14.

decorative plants, including those removed from the beds at the approach of winter, as heretofore have been dis-

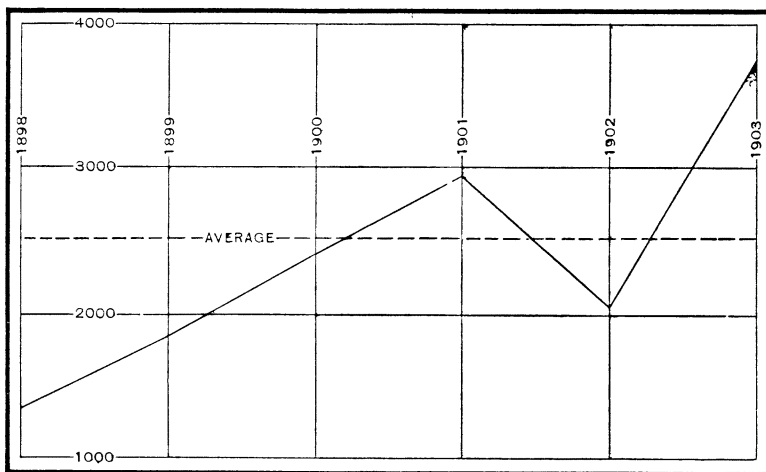
DIAGRAM B.



SPECIES AND VARIETIES CULTIVATED.

tributed to schools, hospitals, etc., the total of such distributions for the year being 3,682, and the average for each of the last five years, 2,581.

DIAGRAM C.

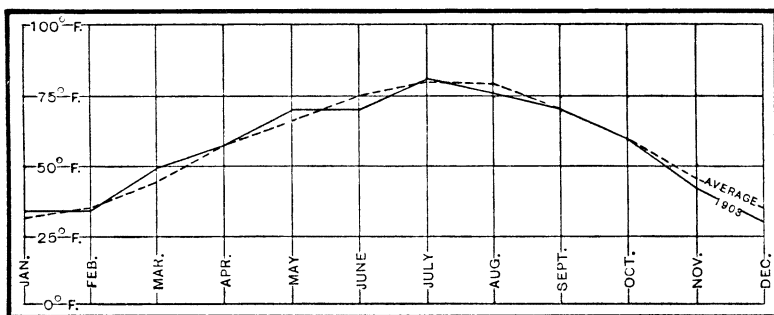


SURPLUS PLANTS DISTRIBUTED.

As shown by the local meteorological summary of the Weather Bureau, the temperature of the year has agreed

closely with the average for the 33 years covered by records, the daily mean being $.4^{\circ}$ F. below the average, for the entire year. The close seasonal comparability of the monthly means with the average is shown by the accompanying diagram, June, alone, of the open months having been sufficiently (5° F.) below the average to appreciably interfere with the customary luxuriant growth of bedding plants, and such aquatics as *Victoria*.

DIAGRAM D.

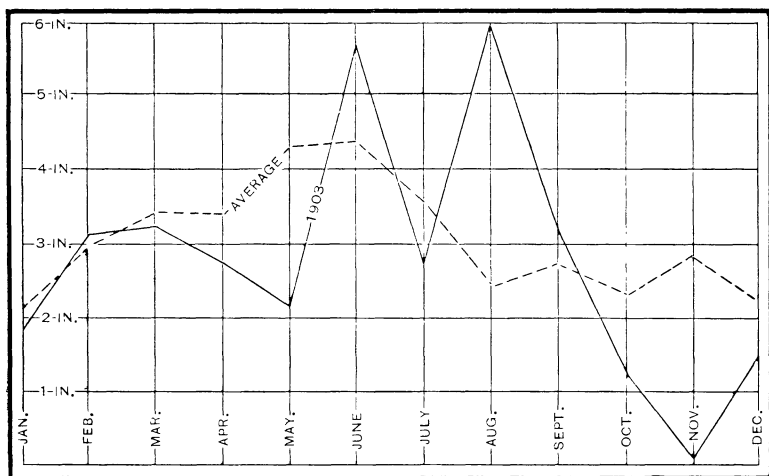


MEAN TEMPERATURES.

The accompanying precipitation curve for the year, with average curve for the past 33 years, shows much greater deviation from the normal as represented by averages. The total precipitation for the year, as shown by the same records, is 3.39 in. less than the average. As the diagram shows, much of this deficiency in rainfall occurred in the spring and autumn months, so that it interfered materially with the successful transplantation of trees and shrubs at both seasons. It has proved possible, however, to maintain the decorative features of the Garden in a more than usually attractive manner through the entire open season.

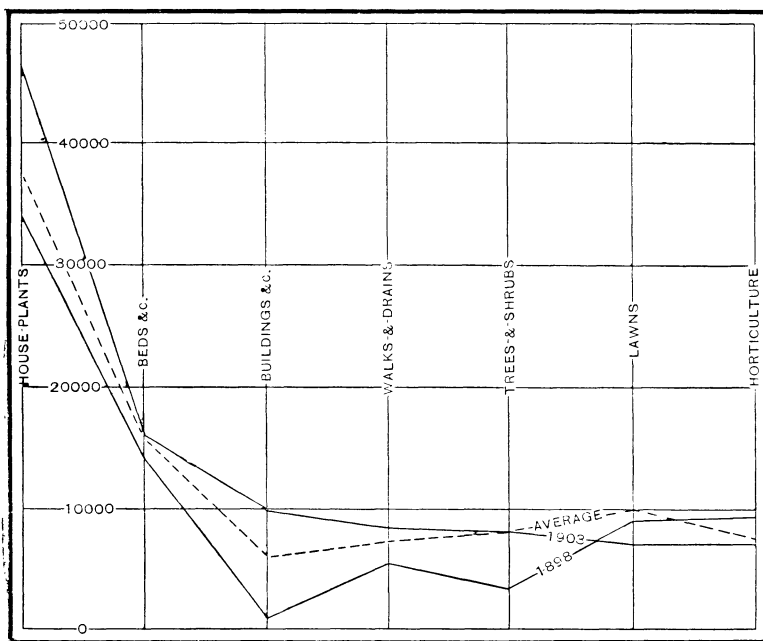
The distribution of labor through the several departments of the Garden is shown by the accompanying diagram, which clearly brings out the increased time devoted to plants

DIAGRAM E.



PRECIPITATION.

DIAGRAM F.



HOURS OF LABOR.

cultivated under glass incident to the recent increases in plant houses; the better care that walks, buildings, fences, and other structures are now receiving; the increased labor demanded by trees and shrubbery since the planting of the North American tract; and the reduced expense of horticultural work. A considerable yearly fluctuation in labor required on the walks and lawns is largely connected with seasonal differences in precipitation.

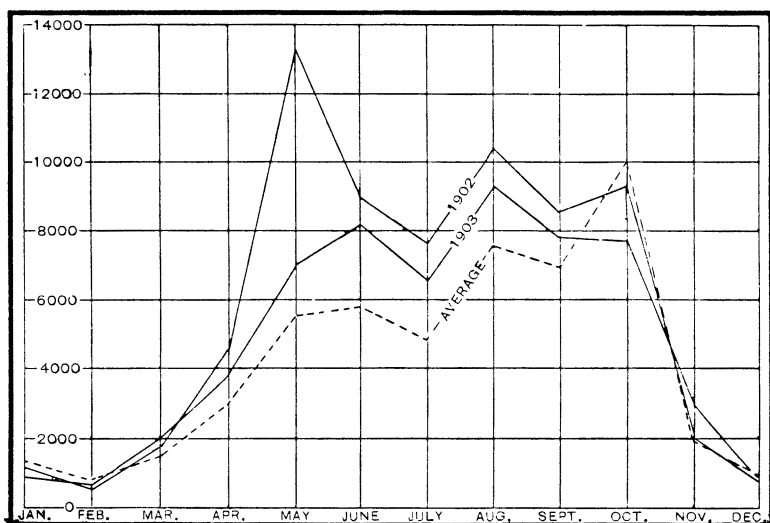
Toward the end of the year, a fire, which originated from a defective flue in the boiler pit from which the newer range of plant houses is heated, damaged the adjacent structures to the extent of about \$1,000.00. It chanced that about this point, in the hot and intermediate houses, were clustered most of the orchids and *Platyneriums*, and many other choice plants, and although the efficient service of the fire department reduced the loss on the buildings to an inconsiderable sum, the heat and smoke destroyed a large part of these collections and so seriously injured the remainder that their recovery is likely to be at best a matter of several years' time. By the prompt action of the Board, however, I have been enabled to replace these collections by other plants of the same or equally decorative species, and it is expected that the early spring will find the orchid collection as large, varied and interesting as before the fire. In connection with this loss, I wish to record my appreciation of the courteous action of the New York Botanical Garden, the Director of which, Dr. N. L. Britton, immediately offered us such duplicates as could be spared from its collections; and a consignment of 80 plants, representing 78 species of orchids, was received from this source as soon as the buildings were sufficiently repaired for their reception.

VISITORS.

The total number of persons who visited the Garden in 1903 was 79,039, of whom 10,516 were recorded for the

open Sunday afternoon in June, and 10,692 for that in September, leaving 57,831 for the week-days of the year. The total for the year has been exceeded twice since records have been kept: in 1901, when 91,262 visitors were reported, and in 1902, when 112,314 were counted. In each of these years the visitors on the two Sunday afternoons when, under Mr. Shaw's will, the Garden is opened, were nearly twice as numerous as in 1903. The

DIAGRAM G.



VISITORS ON WEEK-DAYS.

number of week-day visitors has been passed once, in 1902, when an unusual interest in the Garden was aroused in May,* but except for that year it is greater than shown by any other record.

The distribution of week-day visitors through the season is indicated on the accompanying diagram, on which, for comparison, are placed the curve for 1902 and the average

* Rept. Mo. Bot. Gard. 14: 17.



NORTH AMERICAN TRACT—CAT-TAILS AND WATER.

curve for the entire period covered by records with the exception of the aberrant year 1902.

This diagram is interesting as showing the increased number of visitors during the open season, in comparison with the average for years prior to 1902; the great increase during the latter year, for which reasons were assigned in my last report; the small but still noticeable effect produced by special attractions out of the spring or summer, as indicated by the slight rise in the curve for November, at which time a display was made of several thousand plants representing some 300 carefully selected and well-grown varieties of chrysanthemums; and the falling off of country visitors attracted by the St. Louis Fair in October, of whom, formerly, two or three thousand flocked to the Garden on a single day, when the weather was favorable. Except for the November aberration, this curve for 1903 may be taken as a fair representation of the normal seasonal distribution of visitors, who reach their smallest number in the coldest month, February, gradually increase until August, when out-of-door life in this latitude is at its maximum — except for July, during which month the exodus from the city and the sense of heat discomfort are greatest, and come in lessening numbers as the cool weather of autumn sets in, the falling off being very rapid after the bedding plants have been destroyed by frost, usually late in October.

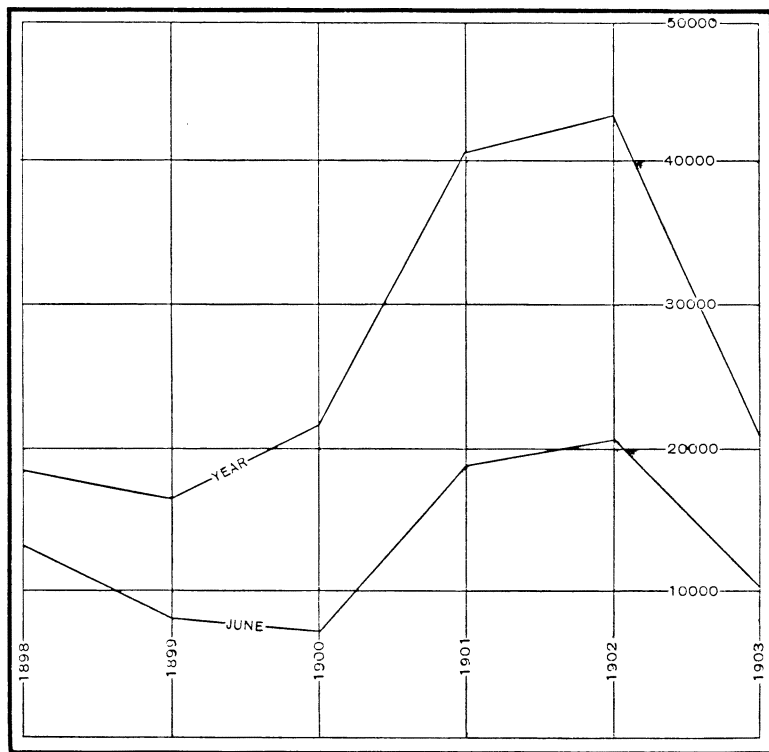
The appended diagram summarizing the Sunday visitors shows once more very clearly the great fluctuation in numbers from year to year and the consequent influence of the records for these two open Sunday afternoons on the totals for any given year.

NATIVE PLANTS.

When established, the new synoptical tract of some twenty acres, devoted exclusively to North American

plants,* is expected to be not only instructive but one of the most attractive parts of the Garden, its configuration being good and the treatment that of an open park in which a liberal use of hardy perennials will afford desirable color. Nearly all of the material needed for this plantation is now

DIAGRAM H.



SUNDAY VISITORS.

in place, and the tract is supplied with water and drainage facilities; but a succession of trying winters has held back the development of the trees to such an extent that the landscape effect of the planting will not be realized for several years yet. Though an essential part of the emphasis

* Rept. Mo. Bot. Gard. 8: 38. 9: 13. 10: 14. 11: 14. 12: 12. 14: 14.

of the plan of planting — which exemplifies the sequence of Orders in the Bentham and Hooker classification, the walks in this part of the grounds have not yet been made, and are not likely to be constructed until the trees are well developed and increasing resort to this collection indicates a need of them, since it is thought better to afford the comfort of a turf walk through the grounds as long as possible, than to provide at once the harder artificial paths that will ultimately be necessary.

NAMING AND LABELING PLANTS.

One of the most important and difficult features of museum administration is the provision of adequate labels with the specimens that are displayed. A collection of living plants is essentially a museum collection, but the difficulty of naming and labeling them is far greater than in the case of a museum in the ordinary sense — where they may be kept under lock and key, or of a zoological garden in which the number of both species and individuals is relatively small while the latter are usually large and of sufficient individual value to lead to the prompt replacement of those which may die. The naming of collections in gardens of any size is notoriously bad, except for the relatively few that are being critically studied, and the Missouri Botanical Garden is probably not much better or worse than comparable institutions; but an effort has been made from the first to see that each plant or clump of plants is provided with a legible label giving its common name, the scientific name under which it was received — standardized by the *Index Kewensis* where possible, its geographical range, and a key number by which its individual history may be traced in the office records.* In this way, if the name has been correctly ascertained, sufficient information is given on a small and unobtrusive label to

* Rept. Mo. Bot. Gard. 6 : 14, 15.

enable a person interested to obtain further information by reference to easily accessible books, or to order a desirable species from dealers in case he wishes to procure it for cultivation.

THE HERBARIUM.

Though the maintenance force in the herbarium has been kept always at the minimum consistent with the preservation of the collections in a reasonably usable condition, uninterrupted if fluctuating growth has been noted each year. In 1903, 37,408 specimens were incorporated. Of these, 3,964, valued (unmounted) at \$198.20, were presented or received by way of exchange; 9,020, valued at \$451.00, were collected by employees of the Garden; 701 were cryptogams belonging to the Bernhardt herbarium, bought many years before his death by Mr. Shaw;* and 24,424 were purchased. The expenditure for the year on herbarium specimens and supplies was \$2,596.98. Among the collections incorporated this year were 3,014 sheets collected by the Director in Madeira, Alaska, etc., 3,098 from the Chapman collection, 1,261 from the Broadhead herbarium, 1,750 of Krieger's Saxon fungi, 1,350 of Rabenhorst's European mosses and 59 Engelmann sheets. Duplicate material to the extent of 1,074 specimens, valued at \$53.70, was distributed to correspondents in 1903.

The total number of specimens in the herbarium is now 465,205, an increase of 157,745, or 51.3 per cent, over the number reported at the end of 1898.† As is shown by the accompanying diagram, this increase in incorporated material, which averages about 10 per cent for each of the last five years, was chiefly effected in 1899, 1902 and 1903, in which years large accumulations of unmounted, and therefore unrecorded, material were mounted and inserted. This

* Rept. Mo. Bot. Gard. **8**: 19.

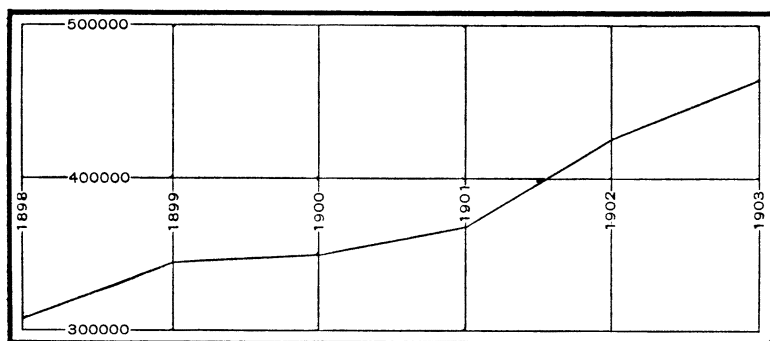
† Rept. Mo. Bot. Gard. **10**: 18.



MEXICAN HOUSE—*Oncidium luridum*.

growth in the herbarium has necessitated the removal of a part of it from the administration building to the old museum, but as this building is of fireproof construction the only resulting disadvantage is somewhat greater difficulty in consulting certain groups in the collection.

DIAGRAM I.



HERBARIUM SPECIMENS.

The herbarium, so far as now mounted, consists of: —

The Engelmann Herbarium (all groups) about . . . 97,859 specimens.

The General Herbarium: —

Higher plants.

The J. J. Bernhardt Herbarium	61,338	
The J. H. Redfield Herbarium	16,447	
The Sturtevant and Smith Herbarium	7,446	
The Gustav Jermy Herbarium .	4,172	
The Chapman Herbarium* . .	3,536	
Other specimens	237,730	330,669 “

Thallophytes.

The J. J. Bernhardt Herbarium	610	
The Gustav Jermy Herbarium .	1,659	
Other specimens	34,408	36,677 “

Making a total of 465,205 “

Valued at \$69,780 75 †

* So far as yet incorporated.

† This valuation, at the rate of \$15.00 per hundred mounted sheets.

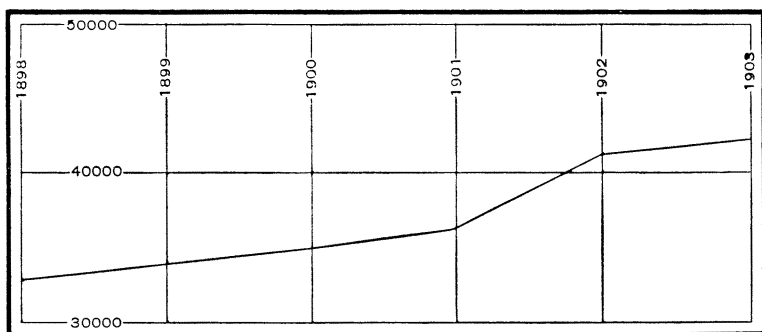
In addition to the herbarium proper, the following material should be noted: —

Wood specimens of various sizes	1,027	valued at	\$100 00
Wood veneers by Hough and others . . .	2,354	" "	165 00
Microscope slides by Penhallow and others	1,051	" "	250 00
Together	4,432	" "	\$515 00

THE LIBRARY.

As in earlier years, a satisfactory growth of the library is to be noted. In 1903, 353 books, valued at \$651.40, and 169 pamphlets, valued at \$46.45, were presented or re-

DIAGRAM J.



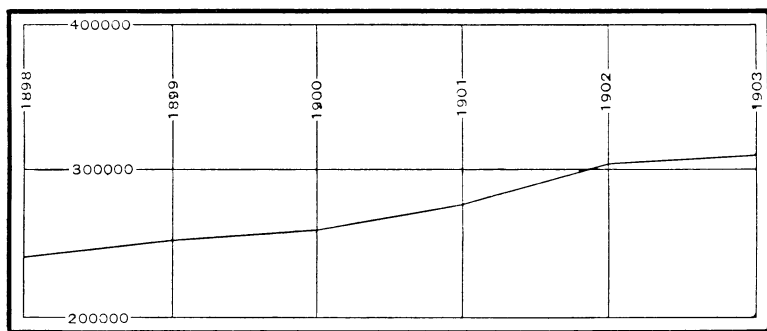
BOOKS AND PAMPHLETS.

ceived in exchange for Garden publications; and 505 books and 11 pamphlets were obtained by purchase. The present total, therefore, is 42,262 books and pamphlets, or an increase of 9,618, or 29.4 per cent, over the 32,643 contained in the library at the end of 1898.* This is an average of about 6 per cent for each of the last five years, the exact distribution of the growth being indicated by the accompanying diagram which shows that the customary growth was experienced in 1903, that for the preceding year having been unusually great.

* Rept. Mo. Bot. Gard. 10 : 19.

Though fewer cards have been written at the Garden than usual, the card index was enlarged in 1903 by the incorporation of 8,263 cards, of which 1,872 were written by employees, 1,067 were presented, and 5,324 were purchased, the expenditure for cards and cases amounting to \$46.07. The total is now 311,218, an increase of 66,533 over the number at the end of 1898. This increase, shown on the accompanying diagram, amounts to 27.7 per cent of the number recorded at the end of 1898,* or about 5.5 per cent for each of the last five years.

DIAGRAM K.



INDEX CARDS.

The Secretary's statement shows that in 1903, \$3,026 70 was spent for library purchases and binding, — in the latter of which directions unusual progress has been made this year though many of the large sets of serials, which have come to us unbound, are still in this condition. As with the herbarium, the library has so far outgrown its quarters in the administration building as to necessitate the removal of many books to the old museum, but the subject classification adopted on the shelves renders these scarcely less accessible than the others, and they are as safely housed.

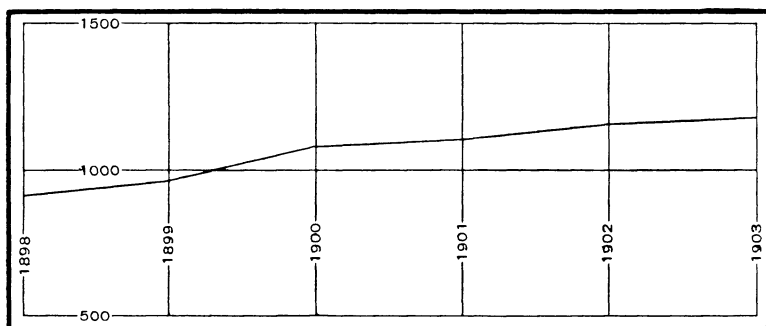
* Rept. Mo. Bot. Gard. 10 : 19.

As now constituted, the library contains: —

Pamphlets	22,788				
Books	19,408				
	42,196	valued at	. . .	\$70,430	85
Manuscript volumes	66	" "	. . .	800	00
Total	42,262	" "	. . .	\$71,230	85
Index cards	311,218	" "	. . .	3,112	18
Total valuation of library				\$74,343	03

The distinct serial publications now received number 1,185, of which 99 represent subscriptions, and 1,086, issued by 831 institutions or publishers, are received in

DIAGRAM L.



SERIAL PUBLICATIONS.

exchange for the Reports of the Garden. With so large a list of periodicals referring to a limited subject, increase is not rapidly made, but 255, or 27.4 per cent, have been added to the 930 recorded five years ago, — an average of about 5.5 per cent for each of the last five years.

In 1903, 235 copies of the now antiquated little handbook of the Garden were sold, and a large number of copies have been presented to bodies of specially invited visitors, — chiefly representatives of the press.



ORCHID BLOSSOMS—*TRICHOPIlia* SUAVIS.

THE MUSEUM.

As has been reported from year to year, this single part of the plan of Mr. Shaw and of the Board of Trustees has been neglected because of the necessity of using the existing small museum building for other purposes. Whenever it shall be freed from such use, I hope to arrange in the building an instructive and attractive synoptical collection, supplementing those furnished by the living plants of the Garden. In the meantime, considerable reserve research material, not of a character to be publicly displayed, is being received and stored in one way or another, and utilized as occasion offers.

RESEARCH AND USE OF FACILITIES.

As was contemplated in the first outline of the policy of the Board, quoted above, the principal research work of the Garden has been concentrated on the North American flora, and during the five years just ended, five monographic studies of groups of plants pertaining wholly or in large part to this flora have been published in the Garden Reports. Horticultural botany has likewise received attention, as have the ecology and teratology of plants. For several years the Garden has been made the headquarters for a laboratory directed by Dr. Hermann von Schrenk of the United States Department of Agriculture, in which much useful work has been done on the diseases of cultivated plants, the causes and prevention of decay in timber, and other economic questions of vast material importance, Dr. von Schrenk having provided, among other things, a greenhouse especially devoted to experimental plant growth in these directions.

Provision is now being made for a phyto-chemical laboratory, by the renovation of the basement of the old museum building, which proves well adaptable to this purpose; and

the use of this laboratory, on its completion and equipment, has been placed at the disposal of Mr. J. B. Nagelvoort, an expert plant chemist, who is desirous of devoting the greater part of his time for some years to a study of the active principles of plants, which it is proposed to have cultivated for this purpose under his direction.

In every feasible way the library, herbarium and living collections of the Garden are made useful to investigators, whether connected with the institution or not. When they can be used here, every possible facility for their use is given visiting botanists. When this is not possible, they are sent to trustworthy persons or institutions, when their safe return is guaranteed; and, except for specimens or books of especial value which could not be replaced in case of loss or those in constant use, the Garden has always stood ready to place its library and collections for a reasonable time at the disposal of the botanical departments of colleges, or of capable investigators not having official connection with the centers of learning.

THE SCHOOL OF BOTANY.

At the end of the last college year, Dr. Hermann von Schrenk, who had been on the instructional force of the School of Botany of Washington University for six years, withdrew to devote his entire time to his important administration and research duties under the Government. His place was taken by Dr. J. A. Harris, who had held the position of Botanical Assistant at the Garden for two years; and Mr. S. M. Coulter, who had been an instructor since the early part of 1901, was promoted to a newly established assistant professorship in the department.

In connection with a newly established department of zoology, an arrangement was this year effected by which Botany 1,* and Zoology 1, of the undergraduate electives,

* Rept. Mo. Bot. Gard. 14:24.

each of three weekly periods for a half year, were replaced by a joint course called Biology 1, of five weekly periods for the same time, — the other electives remaining unchanged.

Both beginning and advanced classes in the School of Botany have shown small but gratifying increase in numbers, which it is hoped may be still greater as the University enlarges after removal to its new site. At the last commencement of Washington University, the degree of Master was conferred on Miss Caroline Rumbold and Mr. Perley Spaulding, and that of Doctor, on Mr. J. A. Harris, the major work of all of whom was in botany. At present one candidate for the Master's degree, and three for the Doctor's degree, with botany as a major, are enrolled at the University.

GARDEN PUPILS.

As has been reported each year, the expressed intention of the founder of the Garden to afford theoretical and practical training in gardening has received earnest care.

In March last, Bruno Nehrling, who had completed the required work and passed a satisfactory examination, was granted the prescribed certificate, and the scholarship so vacated, and one freed by the withdrawal of Oliver Marker, were awarded on the result of competitive examination to Shelby C. Jones of Chicago, and Walter Hummel of Milwaukee. On the nomination of the State Horticultural Society, G. D. Schulte was given a scholarship formerly held on the same nomination by Robert Meyer, resigned; and on the nomination of the St. Louis Florists' Club, Walter Gillies was given a scholarship formerly held on the same nomination by William Polst, resigned. Two pupils are expected to complete their work in March next, and an announcement that the scholarships so vacated will be awarded in the spring on the result of competitive examination, was issued in December.

The course of instruction is indicated in detail on the appended table.

YEAR.	TERM.	STUDIES.					PER WEEK.
SECOND.	April to June.	Floriculture. 3 exercises weekly.	Economic Entomology. 1 exercise weekly.		Surveying. 2 exercises weekly.		6
	July to Sept.	Floriculture. 3.	Economic Entomology. 2.	Book-Keeping. 1.			6
	Oct. to Dec.	Floriculture. 1.	Economic Entomology. 2.		Surveying. 1	Elementary Botany. 3	7
	Jan. to Mar.	Floriculture. 1.	Twigs of Woody Plants. 1.	Orchard Culture. 1.	Landscape Gardening 1	Elementary Botany. 3	7
THIRD.	April to June.	Vegetable Gardening 4			Landscape Gardening 1	Botany of Wild Flowers. 2	7
	July to Sept.		Economic Mycology. 1	Orchard Culture. 2	Landscape Gardening 1	Botany of Garden Flowers. 2	6
	Oct. to Dec.		Economic Mycology. 3	Garden Accounts. 1	Botany of Fruits. 2		6
	Jan. to Mar.		Economic Mycology. 3	Garden Accounts. 1		Botany of House Plants. 2	6
FOURTH.	April to June.	Orchard Culture. 1	Forestry. 1	Book-Keeping. 1	Surveying and Drainage. 3		6
	July to Sept.	Small Fruit Culture. 4			Botany of Weeds. 1	Botany of Vegetables 1	6
	Oct. to Dec.	Special Gardening 2	Forestry. 1	Vegetable Physiology 2		Botany of Woody Plants. 2	7
	Jan. to Mar.	Special Gardening 2	Forestry. 1	Vegetable Physiology 2	Botanical Geography 1	Botany of Ferns. 1	7

In the five years just closed, seven young men have satisfactorily completed the prescribed course of study



EAST INDIAN HOUSE—*NEPENTHES*.

and have received certificates attesting this fact, and a number of others have taken a part of the work, several of them without the advantage of scholarship grants. Most of these pupils who have completed or largely performed the work offered, have left the Garden for useful positions; and the development of the earlier graduates of the school of gardening gives, each year, increasing and gratifying evidence of Mr. Shaw's wisdom in providing for it.

THE GARDEN STAFF.

At the beginning of the year, Mr. James Gurney, who for many years before Mr. Shaw's death was his Head Gardener, and had continued in that capacity since the establishment of the Garden on its present basis, retired from active service on account of his advanced age. By action duly sanctioned by the Board, he has been made Head Gardener Emeritus, with merely nominal advisory duties, and has thus been given opportunity to devote to the improvement of decorative plants, the larger part of the time formerly employed in looking after the details of gardening.

On the retirement of Mr. Gurney from active service, the office of Superintendent was created, and Mr. H. C. Irish, who for a number of years has been Horticultural Assistant at the office, was appointed to this new position, with responsibility for the general maintenance of the property in addition to the details of gardening, instruction of pupils, and horticultural research, in all of which he has rendered most efficient service.

In the autumn, Dr. Harris resigned his position as Botanical Assistant, to accept an instructorship in the School of Botany of Washington University, and his place was taken by Mr. Aaron G. Johnson, a student in the South Dakota Agricultural College. Mr. C. E. Hutchings

has resumed his place as stenographer, after an absence of a year and a half. In the library, no changes have been made except that Miss Mary A. Norton withdrew at the beginning of the year, no appointment being as yet made to the vacant position, Miss Eva Perles, as in 1902, continuing to give assistance in checking accessions, indexing illustrations, etc. During the greater part of the year, in addition to the services of an extra mounter, the herbarium has received the care of Miss Florence Thiell, who has been occupied with the incorporation of newly mounted material, etc.

SPECIAL TESTAMENTARY PROVISIONS.

Three annual events provided for in the will of Mr. Shaw have taken place, as follows: —

The annual flower sermon was preached in Christ Church Cathedral, St. Louis, on the morning of May 14th, by Rev. William A. Guerry, Chaplain of the University of the South.

The fourteenth banquet to the Trustees of the Garden and their guests was given at the Southern Hotel, on the evening of January 1st, 1904, having been deferred from the usual time in May, so that gentlemen in attendance on the national scientific meetings, held in St. Louis in Convocation Week, might be invited. About 240 guests, including many distinguished educators and investigators, were present. Speeches appropriate to the occasion were made by President Carroll D. Wright, of the American Association for the Advancement of Science, Hon. David R. Francis, of St. Louis, President David S. Jordan, of the Leland Stanford Junior University, Mr. Smith P. Galt, of St. Louis, Dr. James Fletcher, of the Canadian Central Experimental Farm, the Director of the Garden, and President Henry S. Pritchett, of the Massachusetts Institute of Technology.

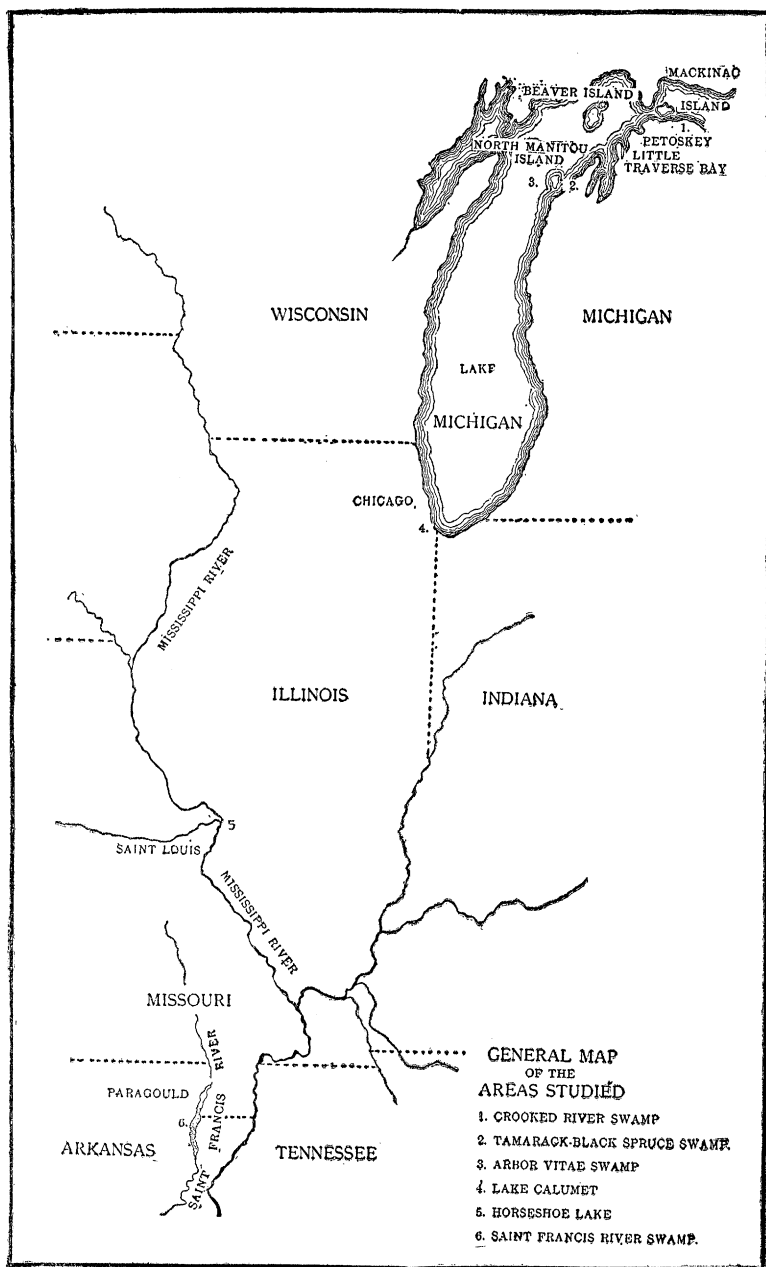
The fourteenth banquet to the gardeners of the institution was given at the Mercantile Club on the evening of Friday, December 11, 1903. Seventy-two persons were present, including—in addition to representatives of the Board of Trustees, the office staff, the instructional force of the School of Botany, and investigators working at the Garden—the gardeners and senior garden pupils of the institution, local florists, horticulturists, market gardeners and seedsmen, a number of gentlemen connected with the approaching World's Fair, and the Secretary of the American Pomological Society. After the dinner, an account of the uses being made of horticulture in the broad sense at the Exposition was given by Mr. G. E. Kessler, Landscape Gardener, Dr. Tarleton H. Bean, Chief of the Department of Forestry, Fisheries and Game, and Professor F. W. Taylor, Chief of the Department of Horticulture and Agriculture, of the Exposition, who illustrated their remarks by lantern views showing plans and progress effected. M. J. Vacherot, Architect of the Parks and Gardens of Paris, was the last speaker of the evening.

As in 1902, no flower show was held in the city, so that again no claim has been made for the premiums provided for in the will of the founder of the Garden.

Very respectfully,

WILLIAM TRELEASE,
Director.

MISSOURI BOTANICAL GARDEN.



SWAMP AREAS